

**CLAIMS**

1. A foil bearing comprising a frame and a foil, characterised in that the foil bearing has a self-aligning mechanism which allows the foil to self-adapt its position.
2. The foil bearing according to claim 1, wherein the foil is attached to the frame and extended between a first and a second attachment point.
3. The foil bearing according to claims 1 and 2, further comprising a supporting and positioning means for optimally positioning and supporting the foil, wherein the supporting and positioning means allows for a self-aligning mechanism.
4. The foil bearing according to claims 1 to 3, wherein the supporting and positioning means is cylindrical and can rotate around two axes normal to its geometrical axis.
5. The foil bearing according to claims 1 to 4, wherein the supporting and positioning means comprises two cylinders attached to the frame and which can rotate around two axes normal to their geometrical axes.
6. The foil bearing according to claim 5, wherein the cylindrical supporting and positioning means are attached to the frame through small pins forming point contacts in blind holes drilled in the cylindrical supporting and positioning means.
7. Te foil bearing according to claims 1 to 3, wherein the supporting and positioning means comprises a spring.
8. The foil bearing according to claims 1 to 7, wherein the foil bearing is externally pressurised.
9. The foil bearing according to claim 8, wherein the external pressurisation is obtained through fluid supplied via the shaft.

10. The foil bearing according to claim 8, wherein the external pressurisation is obtained through fluid supplied via the foil.
11. The foil bearing according to claims 8 to 10, wherein the external pressurisation is obtained through one or multiple flexible fluid supplies.
12. The foil bearing according to claims 8 to 11, wherein said flexible fluid supply is a rubber or a plastic hose.
13. The foil bearing according to claims 9 to 12, wherein the fluid is gas, more in particular air.
14. The foil bearing according to claims 1 to 13, wherein the foil is additionally fixed to the middle of the frame.
15. The foil bearing according to claim 14, comprising two additional cylindrical supporting and positioning means allowing for the self-alignment of the foil and thereby supporting and positioning the foil on a different position than the other supporting and positioning means.
16. The foil bearing according to claims 1 to 15, comprising a second foil, attached to the frame at two attachment points.
17. The foil bearing according to claim 16, wherein the two foils are interwoven.
18. The foil bearing according to claims 1 to 17, wherein said foil has stiffening ribs or any other texture or cross-sectional profile, to enhance stiffness and/or damping.
19. The foil bearing according to claims 1 to 18, wherein said foil is supported by electromagnetic, magnetostrictive, piezoelectric or any suitable type of actuator, so that the foil could be moved statically or dynamically during operation, whereby its characteristics could be controlled.

20. The foil bearing according to claims 1 to 19, wherein said foil is made of metal.
21. The foil bearing according to claims 1 to 19, wherein said foil is made from a "smart" material, e.g. PVD or piezoelectric material, so that the characteristic of the foil could be changed during operation, by controlling an electric current that is fed to the foil.